

Reading Between the Signs: How are transitions built in signed languages?

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Duarte, Kyle and Sylvie Gibet. "Reading Between the Signs: How are transitions built in signed languages?" In Proceedings of TISLR 10, West Lafayette, IN, USA, 2010.

The SignCom Project

- 35 minutes of LSF data
 - Video data @ 25 fps
 - Motion capture (mocap) data @ 100 fps
 - Biometric data encodes sign phonetics



Cognitive Categories

- English *r* and *l* vs. Japanese *r/l*
 - Can vary by language
- Some psycho- & neurolinguistic research on handshape
 - Mathur, Emmorey, etc.
- Little biometric data available

Movements vs. Transitions

- Find cognitive categories:
 - intra-sign “movements”
 - inter-sign “transitions”
- Find biometric/phonetic motion targets
- SignCom goal => signing avatar

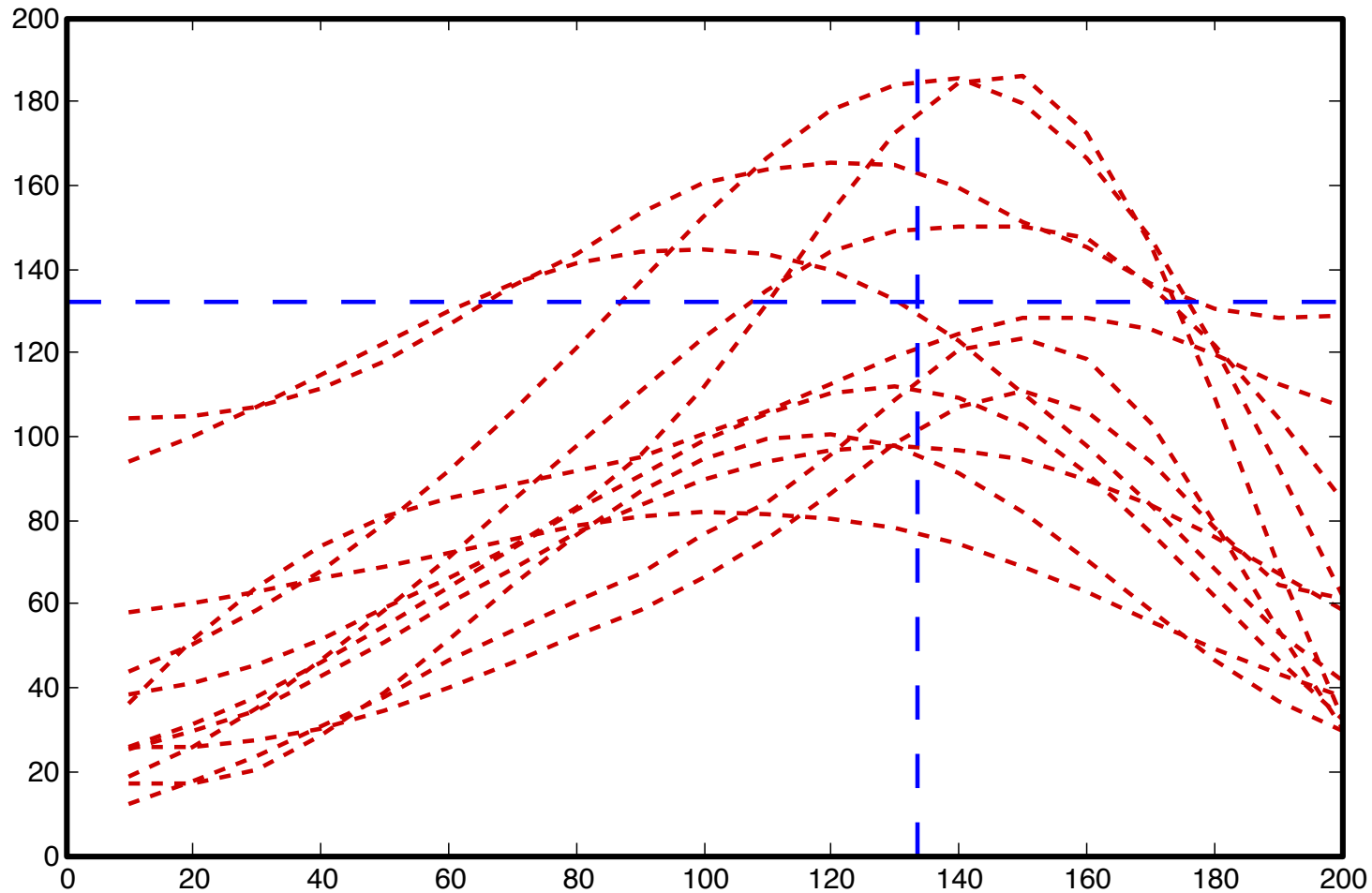
Johnson & Liddell System (in progress)

- Describes placements - movement types connect PLs
- ex: BONJOUR (LSF - “good day”)

<u>P</u>		<u>T</u>		<u>D</u>
HCI	-----			
PL1		--		PL2

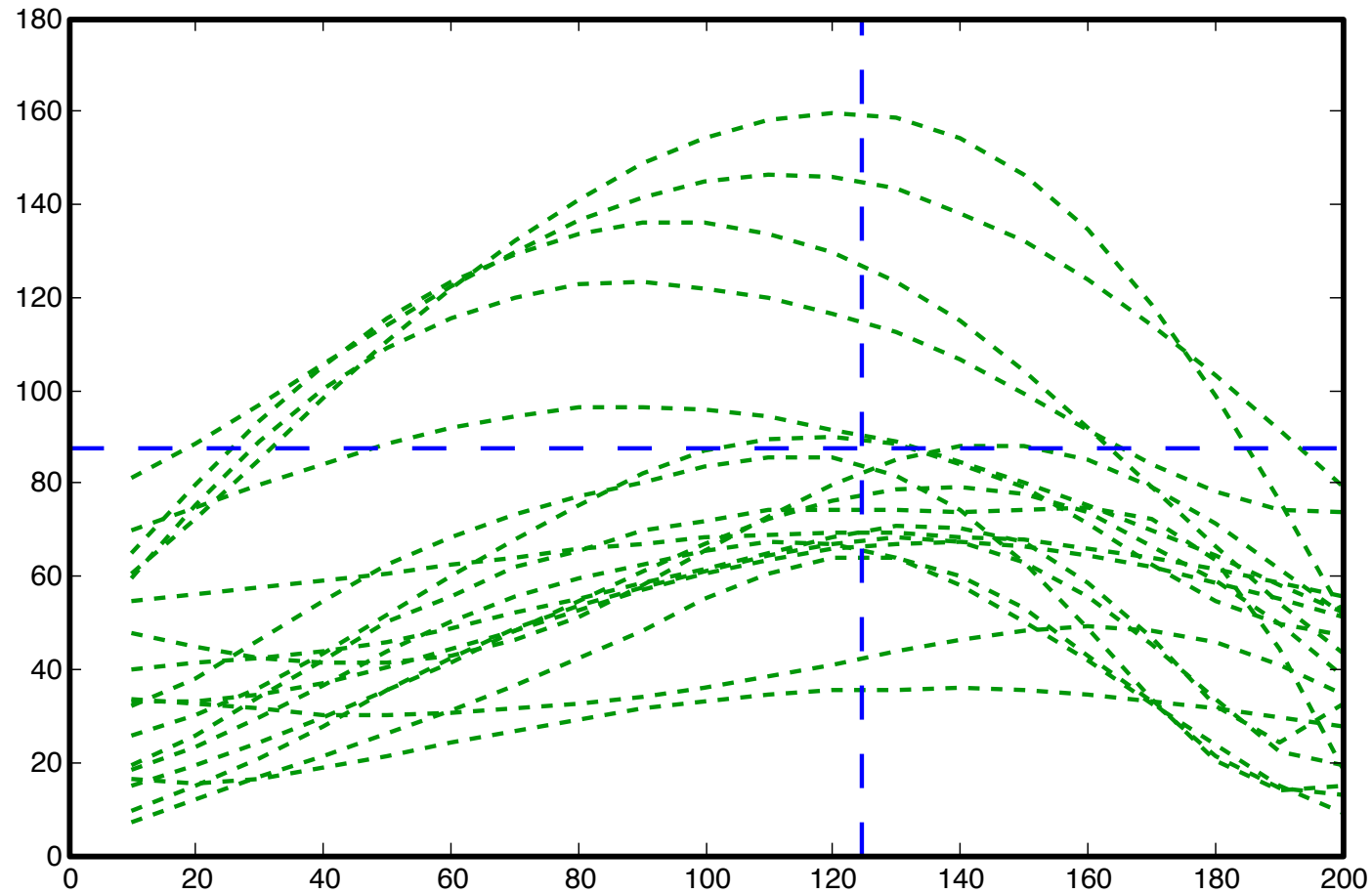
Movements (within Signs)

Ballistic movements



Vmax of 132 @ .65 ($\sigma=.11$; $N=12$)

Controlled movements



Vmax of 87 @ .60 ($\sigma=.12$; N=18)

Movements (within Signs)

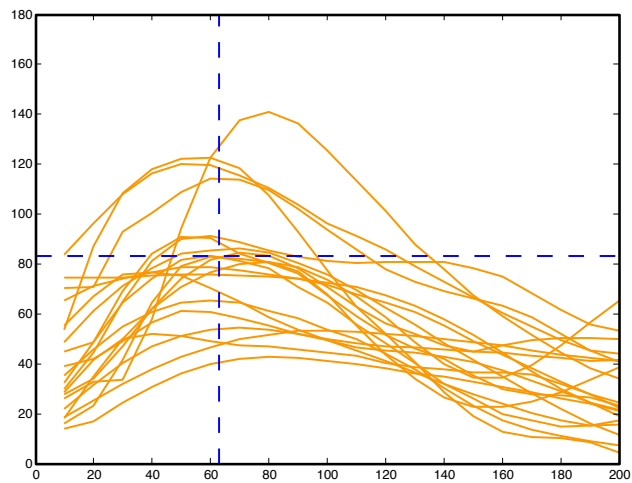
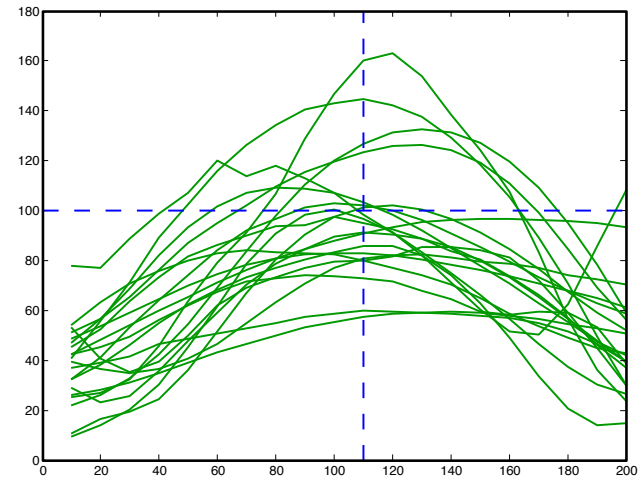
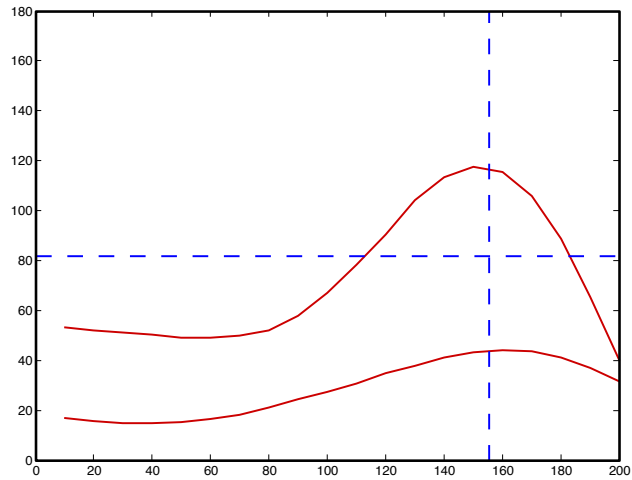
	tVmax	σ	N
Ballistic	0.65	0.11	12
Controlled	0.60	0.12	18

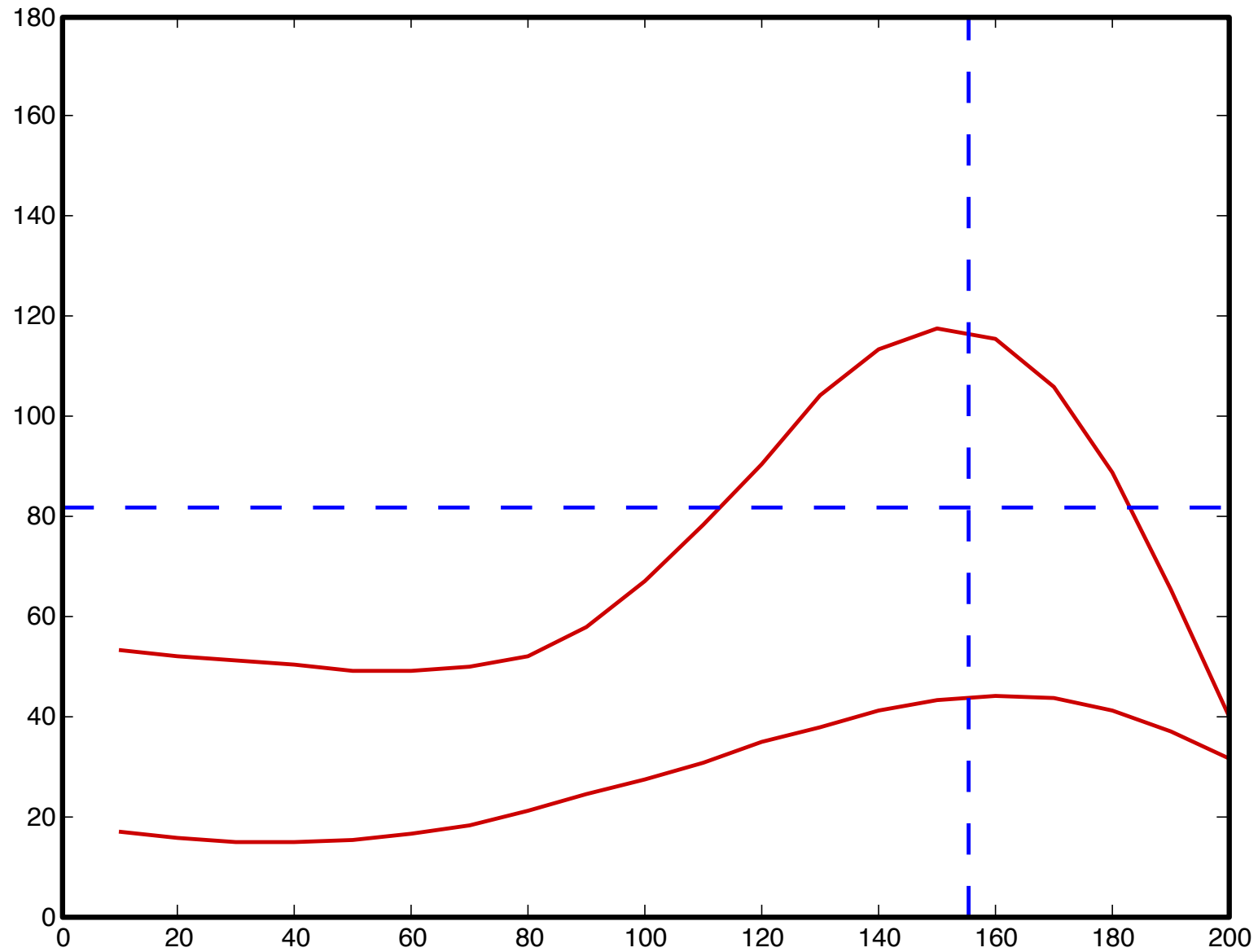
} P = .2579

This difference in categorization is **NOT** statistically significant

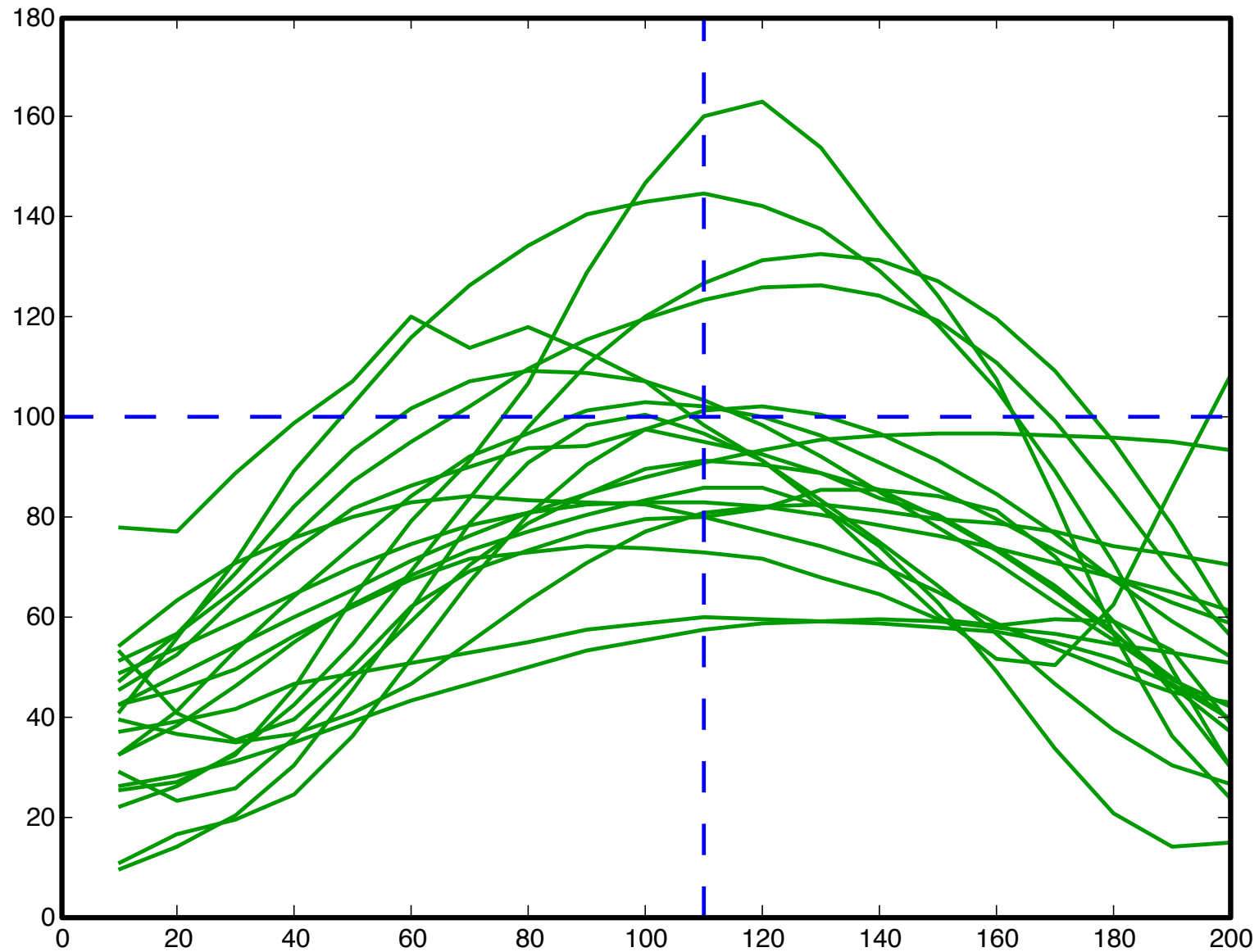
Transitions (between signs)

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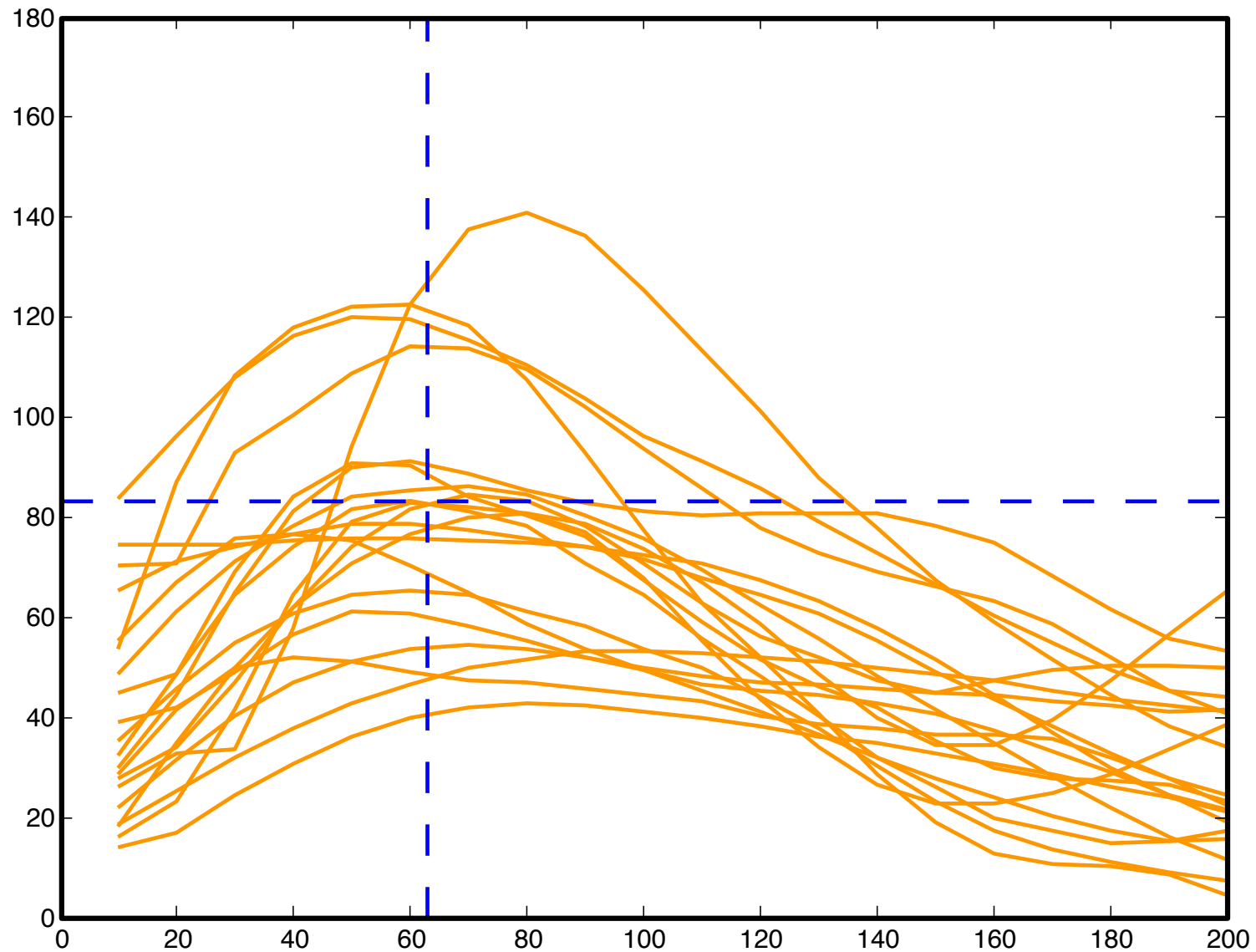




Vmax of 8l @ .76 ($\sigma=.04$; N=2)

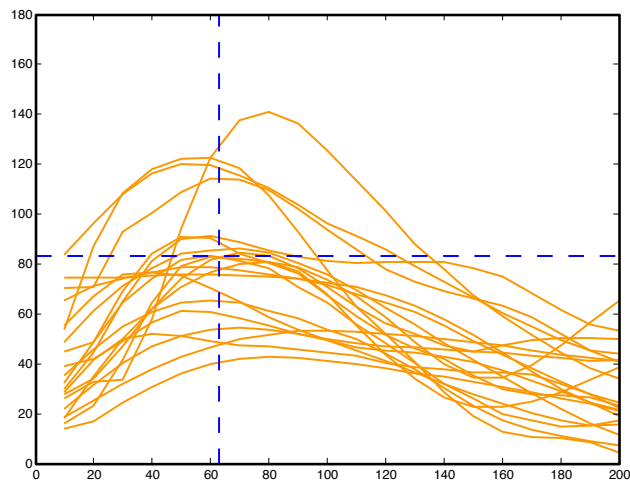
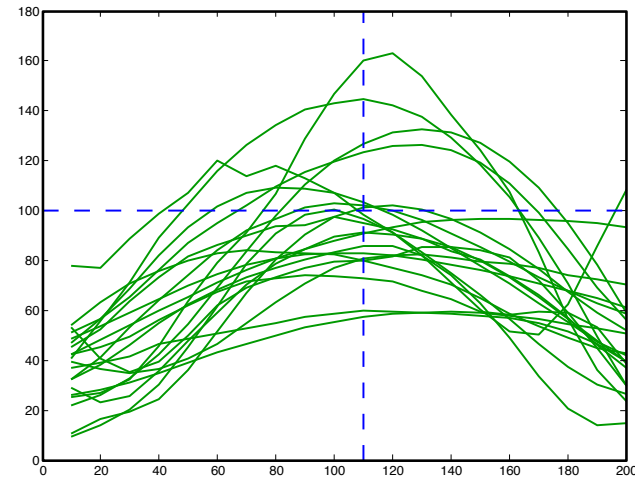
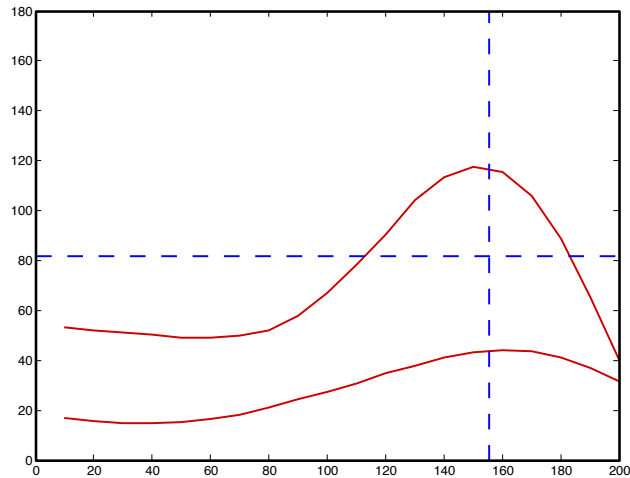


Vmax of 100 @ .52 ($\sigma=.12$; N=20)



Vmax of 83 @ .28 ($\sigma=.08$; N=20)

Transitions (between signs)



	tV_{max}	σ	N
Ballistic	0.76	0.04	2
Controlled	0.52	0.12	20
R-Ballistic	0.28	0.08	20

Transitions (between signs)

	tVmax	σ	N
Ballistic	0.76	0.04	2
Controlled	0.52	0.12	20
R-Ballistic	0.28	0.08	20

} P = .0121

} P < .0001

Statistically significant

Comparing Movements to Transitions

	tVmax	σ	N
Ballistic	0.65	0.11	12
Controlled	0.60	0.12	18

P = .1990

P = .0475

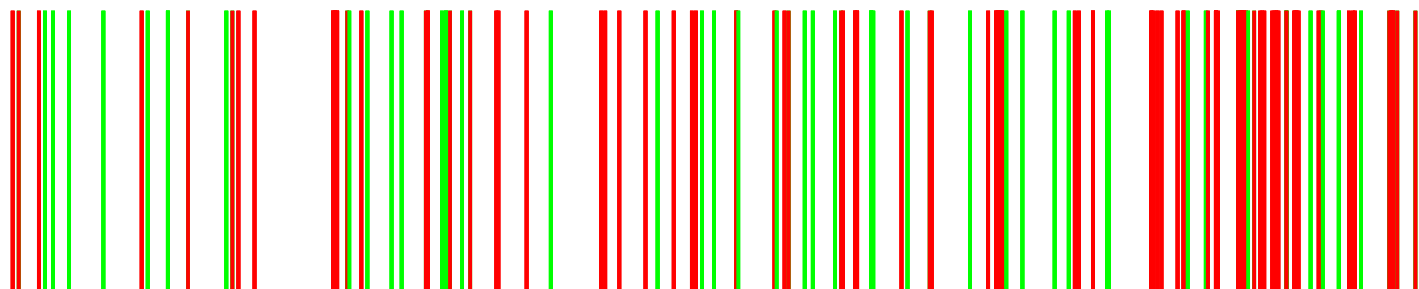
~~Both not significant~~

	tVmax	σ	N
Ballistic	0.76	0.04	2
Controlled	0.52	0.12	20
R-Ballistic	0.28	0.08	20

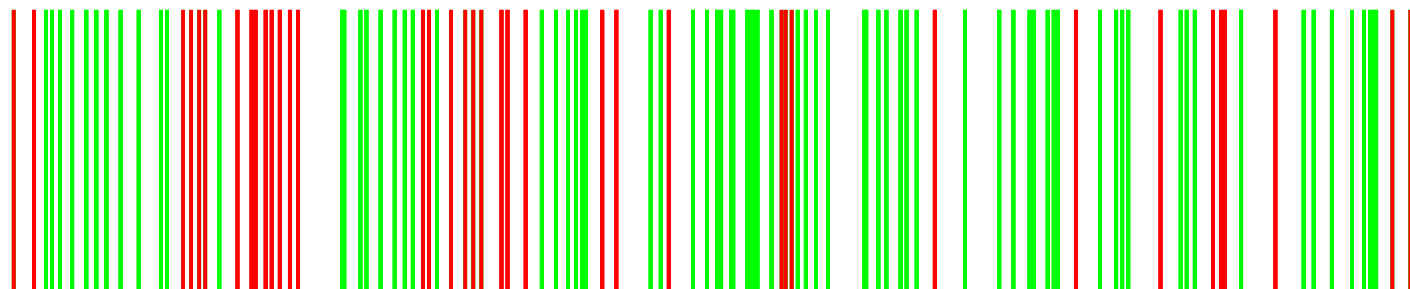
Automatic Data Segmentation

Automatic segmentation

Automatic



Manual



Based on a 2-frame margin of error; 65% recognition